AN2013
Application note

TS4994 low voltage differential audio power amplifier Evaluation board user guidelines

Features

- TS4994 low voltage differential audio power amplifier with programmable standby mode
- Operating range from V_{CC}= 2.5V to 5.5V
- 1W output power @ V_{CC}= 5V, THD=1%, F= 1kHz, with 8Ω load
- Ultra low power consumption in standby mode (10nA)
- 100dB PSRR @ 217Hz in grounded mode (Av=1V/V)
- Near zero pop & click
- Ultra low distortion (0.1%)
- Module gain set at 1V/V
- Thermal and short-circuit protection

Description

The DEMO TS4994 is an evaluation board designed for the TS4994 low power differential audio amplifier. The micropackage DFN10 (dual flat non leaded 10 pins) allows space saving and good thermal dissipation.

The differential gain is set at 1V/V and can be adapted if necessary with a modification of R1 to R4 values. Av=R2/R1=R4/R3 with R1=R3 and R2=R4.

On the board, you can set the Cn3 and Cn4 jumpers to modify the input configuration from capacitor coupled to common mode feedback. In capacitor coupled configuration, the -3dB cut-off frequency in Hz is:

1/(6.28xR1xC1) = 1/(6.28xR3xC2)

with R in Ohm, C in Farad and C1=C2.

For more detailed information about component calculation, refer to the TS4994 datasheet.

1 Evaluation board connector configuration

Connectors	Description
Cn1 and Cn2	Input signal connector (GND and active input signal).
Cn3 and Cn4	Connectors to modify input configuration (from capacitor coupled = no jumper to common mode feedback = short-circuit).
Cn5	Output signal connector (V_{o+} and V_{o-})
Cn6	Mode standby control connector (GND, standby, V_{CC}). Allows you to select standby mode active high or low.
Cn7	Standby control connector (GND, standby, V_{CC}).
Cn8	Power connector (V_{CC} and GND). Power supply voltage from 2.5V to 5.5V.

Caution: When you apply power supply through Cn8, DO NOT invert the polarity because it would destroy the amplifier U1.

2 Schematic diagram

Figure 1. Schematic diagram of the TS4994 DFN10

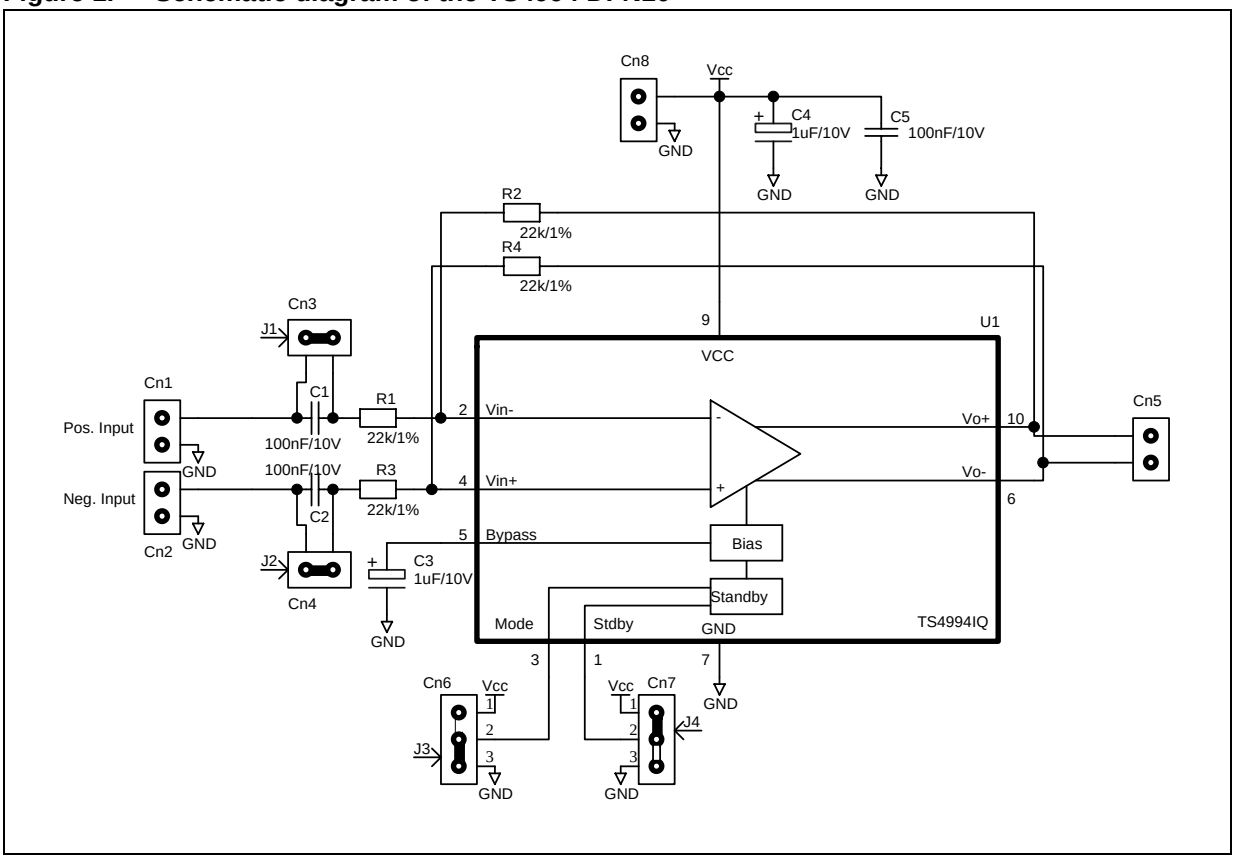


Table 1. Component list for the DEMO TS4994 DFN10

Designation	Quantity	Description
C1	1	100nF/16V, ceramic capacitors, 0603
C2	1	100nF/16V, ceramic capacitors, 0603
C3	1	1µF/50V, electrolytic capacitor
C4	1	1µF/50V, electrolytic capacitor
C5	1	100nF/16V, ceramic capacitors, 0603
Cn1	1	2 pins header 2.54mm pitch
Cn2	1	2 pins header 2.54mm pitch
Cn3	1	2 pins header 2.54mm pitch
Cn4	1	2 pins header 2.54mm pitch
Cn5	1	2 pins header 2.54mm pitch
Cn6	1	3 pins header 2.54mm pitch
Cn7	1	3 pins header 2.54mm pitch
Cn8	1	2 pins header 2.54mm pitch
J1 to J4	4	Jumper, 2.54mm pitch
R1	1	22kΩ, 1/16W 1% resistor, 0603
R2	1	22kΩ, 1/16W 1% resistor, 0603
R3	1	22kΩ, 1/16W 1% resistor, 0603
R4	1	22kΩ, 1/16W 1% resistor, 0603
U1	1	TS4994IQ (DFN10 package)

3 Evaluation board layout

The following figures show the layers and the top view of the TS4994 demoboard.

Figure 2. PCB top layer

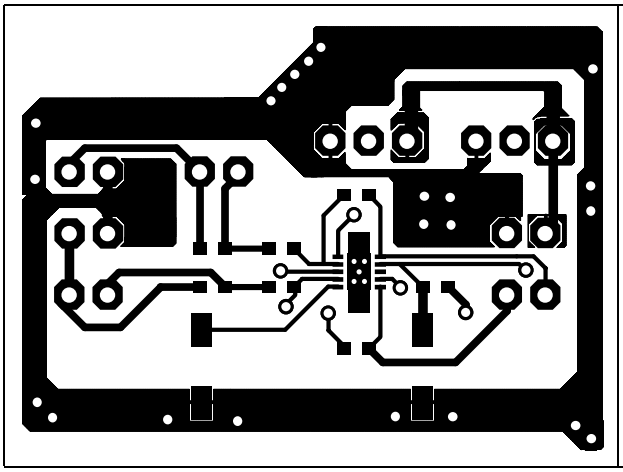


Figure 3. PCB bottom layer

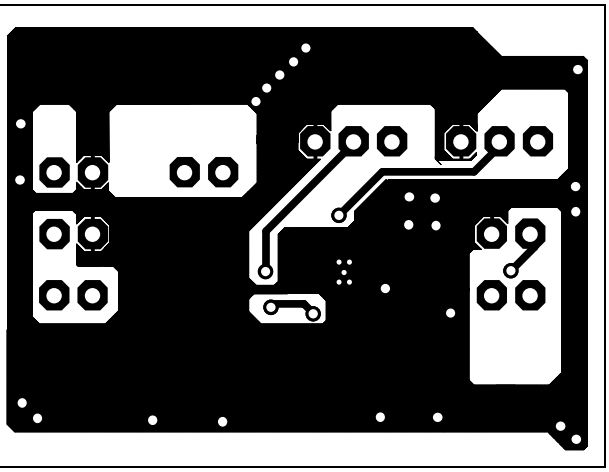
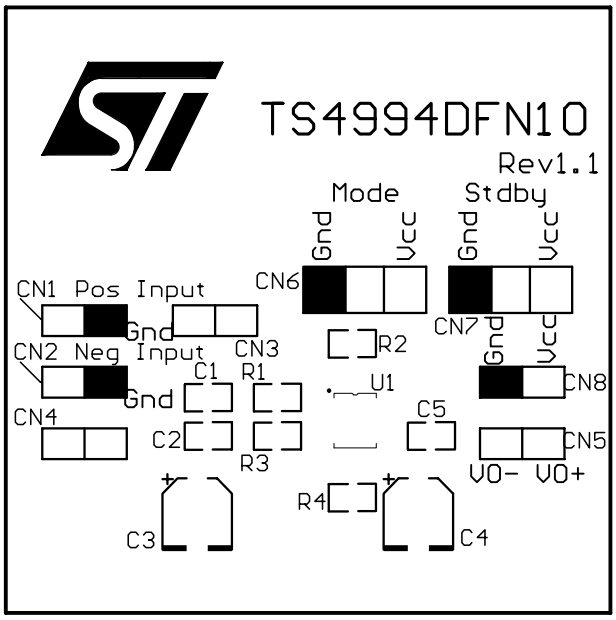


Figure 4. Top view of demoboard



Revision history

Date	Revision	Changes
3-Aug-2004	1	Initial release.
8-Dec-2006	2	Format update.
16- Apr-2007	3	*Figure 4* updated (PCB is now Rev 1.1).

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